Indeed, judging from the small amount of damage done to buildings in which flat or square stones and flat floors have been used, I should doubt whether the shock was much more severe than that which not long ago damaged the brick buildings in East Anglia.

At both Oneglia and Diano Marina the building material is usually rounded stones from the beach, or rubble with stones of all shapes and sizes. The stucco is apparently expected to make good any deficiencies. Besides this the floors are nearly always brick arches abutting against the vertical walls, without any reference to other lateral support. Most of these houses are three or four stories high. Of course any vibration affecting buildings of this construction will split the walls in all directions, for besides the lateral thrust of the arches, the walls are full of wedge-shaped stones ready to slip into any fissures which may form.

The complication caused by these arched floors makes it very difficult to trace the direction or angle of emergence of the shock. CLEMENT REID

Oneglia, March 13

Scorpion Virus

ALLOW me to state that the results of my experiments on Cape scorpions are in full accord with Prof. Bourne's conclusion that the poison of the scorpion has no fatal effect on the same individual or another individual of the same or even of another species. Speaking before the South African Philosophical Society in February 1883, I said :—" Members of the Society will see on the table a scorpion of the larger (Cape) species. That scorpion I caught at 11 o'clock this morning. I at once pierced him in three places with his own sting, on which in each case there was a drop of poison. In the last inoculation I held the sting in the wound, and squeezing the 'bulb of the sting' with the pincers forcibly injected poison. The creature is alive and active" (Proceedings for 1883). These and subsequent experiments, however, led me to believe that the poison has *some* effect, causing sluggishness and torpor for a while. I quite agree with Prof. Bourne that it is physically possible for a scorpion to sting itself in a vulnerable place ; and though I never was able to observe the infliction of a wound on itself by any scorpion, I can well believe that this is possible, but, I am convinced, wholly accidental.

I found also that the poison of the ring-hals snake (*Naja hæmachates*) was not fatal when inoculated in the same individual or another individual of the same species.

University College, Bristol C. LLOYD MORGAN

The Supposed Myzostoma-cysts in *Antedon rosacea*

SOME eighteen months ago I called attention in these columns (vol. xxxii. p. 391, and vol. xxxiii. p. 8) to certain malformations which I had discovered on the pinnules of *Antedon rosacea* from various British localities. They often take the form of small cysts which are very like those produced by encysting Myzostomida on the arms and pinnules of various Crinoids from the Pacific ; and as no other cyst-builders but *Myzostoma* were then known to infest the Crinoids, the inference seemed a natural one that the cysts on the pinnules of *Antedon rosacea* had been produced by a small member of this genus. I subsequently found several more cysts on some examples of *Antedon rosacea* which were dredged at Gibraltar by the Italian corvette *Vettor Pisani*, and the whole collection was sent to my friend Prof. L. von Graff for examination.

To our great surprise, however, he has not found a single *Myzostoma* in any one of the fourteen malformations of the pinnules, whether cysts or otherwise, which he has opened ; and "the new British Myzostoma" must therefore be disestablished.

But what, then, has been the cause of these malformations? Prof. von Graff has found them to be always associated with the presence of a minute globular body, which has the appearance of an egg that has undergone superficial cleavage, but yet exhibits no trace of nuclei when stained. It is impossible to decide at present what this structure may be. Prof. von Graff has described it more fully in a "Supplementary Report on the Myzostomida of the *Challenger* Expedition" which he has just completed. But its nature seems to be as problematical as that of the sacculi ; and fresh material, not spirit specimens, must be examined before we can expect to learn much more about it. In any case, however, it would seem that we have to deal with a hitherto unknown parasite of the Crinoids, which is capable of producing modifications in the calcareous tissues of the arms and pinnules, of essentially the same character as those caused by *Myzostoma*, though of smaller size.

I would commend the question to the attention of those naturalists who may meet with *Antedon rosacea* in the dredgings of the ensuing season ; and in order that they may know how to catch their hare, I shall be most happy to forward specimens of the cysts to anyone who desires to become acquainted with their external appearance. I may add that the largest cysts I have seen are on Comatulæ from the Cumbrae, Milford Haven, and Gibraltar ; while I have no knowledge of their occurrence either at Naples or anywhere else in the Mediterranean.

Eton College P. HERBERT CARPENTER

On some Observations on Palæobotany in Goebel's "Outlines of Classification and Special Morphology of Plants"

THE few modern authors of botanical text-books who have ventured to summarise recent palæobotanical researches have achieved but moderate success. These authors have too little knowledge of the rapid progress of the study of fossil plants during the last few years to make success possible ; hence, their summaries, if not absolutely inaccurate, are usually misleading. So long as these errors are confined to works published in Continental languages, British palæobotanists need not take the trouble to correct them. But the case is altered when English translations of these books appear amongst us. Palæobotany has nowhere made greater progress during the last few years than with ourselves. Many errors have been corrected, and new truths, results of careful and prolonged investigations, have taken their place. With the more important of these new discoveries many of our younger students of geology are now familiar. It is desirable that what they have been taught should not be contradicted by the utterances of authors ignorant of the subjects upon which they venture to express an opinion.

Some little time ago Dr. Goebel, of Rostock, published a volume which was virtually a new edition of Book II. of Sachs's "Lehrbuch der Botanik," and an English translation of this volume, made by Mr. H. E. F. Garnsey, and revised by Prof. I. B. Balfour, has just appeared. Dr. Goebel's volume contains some references to the Palæozoic flora which are seriously behind the times. To allow these statements to reach our students uncorrected will do harm, because they must suggest to those students that certain questions are still open and debatable which cannot now be regarded as such.

Had I not unfortunately misunderstood a wish expressed by my friend Prof. Balfour, some explanatory footnotes would have been introduced into the above volume, which would have rendered this communication unnecessary.

On p. 193 of the translation we find the following statement :—"Other groups are the Sphenophylleæ, Lepidodendreæ, and Sigillarieæ, the first of which are only heterosporous Lycopodiaceæ." We have no reasons for concluding that Sphenophyllum is Lycopodiaceous, still less that it is heterosporous. This latter statement rests upon M. Renault's interpretation of a minute *multicellular* fragment which he observed in a sporangium, and which he believed to be a macrospore ; it could not be this, since the exosporium of a macrospore is a *unicellular* organism. On the other hand, the Lepidodendra were both homosporous and heterosporous. As to the Sigillariæ, even M. Renault now admits that all the vertically-fluted forms are Lycopodiaceous. The assertion that the Lepidodendra were all heterosporous is repeated on p. 196. On p. 272 we have a brief paragraph of eight lines remarkable for the number of the inaccurate statements which it contains. I have indicated these inaccuracies by reproducing them in italics.

"The Calamites are Equisetaceæ which appear in the older geological formations, *beginning in the Carboniferous Limestone* (1), culminating in the Coal-measures, and disappearing in the Permian formation. The spikes of sporangia are either not known, or so badly preserved (*Calamostachys*) (2), *that their structure cannot be determined ; it remains doubtful, therefore, whether they were homosporous or heterosporous forms* (3). The stems *had neither leaves* nor leaf-sheaths, *or else these were transitory formations and soon fell off* (4). In other respects *the structure of the stems resembles that of the Equisetaceæ* (5).

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Their surface was marked with ridges (6), and they had a central hollow divided by diaphragms."

I will examine these statements *seriatim*.

(1) The author appears to have been strangely ignorant of Sir William Dawson's magnificent discoveries of Calamites and other Carboniferous plants in the Devonian strata of North America, announced in his Report on the subject in 1871.

(2) In 1874 I published in the Philosophical Transactions the detailed structure of extremely beautiful examples of *Calamostachys Binneyana*, and, since then, Prof. Weiss, of Berlin, has figured equally fine examples of *Calamostachys Ludwigi*. In the Philosophical Transactions for 1881 I further showed that this genus comprehended both homosporous and heterosporous forms. At the same time Calamostachys is not the fruit of Calamites.

(4) Both Sir William Dawson and Prof. Weiss have shown that the slender twigs of Calamites were abundantly supplied with verticils of linear leaves.

(5) This statement is true with an important limitation, which Dr. Goebel ignores; or, as a follower of M. Renault, he more probably rejects. Whilst the type of Calamitean organisation is unquestionably Equisetiform, their arborescent stems and branches contained an enormous xylem or woody cylinder, developed exogenously, which made them differ very widely from their degenerate living representatives.

(6) This is a repetition of the old fallacy, which regarded the vertical groovings of the surfaces of the inorganic casts of the fistular medullary cavity as belonging to the cortical surface. We have now numerous sections of the Calamitean cortex, no one of which exhibits the slightest trace of vertical flutings; they are all smooth.

On p. 281, speaking of heterosporous Lycopodiaceæ, the author accepts M. Renault's old conclusions that in Lepidodendron "there is no certain indication of secondary growth in thickness." "The connection of fossil stems capable of great increase in thickness, such as the Sigillarieæ and Calamodendron is at present questioned." These facts are no longer capable of being justly questioned. The structure of *Lepidodendron Selaginoides* alone suffices to settle the matter so far as that genus is concerned; to say nothing of the many other species that demonstrate the same fact. M. Grand'Eury himself, long one of the most influential questioners, has now recognised that the genus Arthropitus only represents the thick woody zone of a true Calamite. Prof. Stur, of Vienna, long ago demonstrated in an unanswerable manner the almost absolute identity of Calamites and Calamodendron; and M. Renault himself, as I have already observed, has still more recently been compelled by the discovery of a Sigillarian fructification by M. Zeiller to alter his view respecting the Sigillariæ. He no longer insists that these cannot be Cryptogams because their stems grow exogenously, but now hands over to his opponents, who have so long contended for the Lycopodiaceous affinities of this Sigillarian genus, all the vertically fluted examples of it.

Whilst deeming it desirable that his readers should be put in possession of the other side of the question to which he refers, it is only fair to Dr. Goebel to say he is himself aware that those questions are dealt with in a one-sided manner. In a footnote on p. 272 of the English translation the author says:—"The short description given in the text from Renault may serve at least to draw attention to these interesting types, in which there is much that is yet uncertain. We cannot enter here into disputed or doubtful points." At the same time it is to be lamented that the leading botanists of the world cannot give us palæontologists more of that valuable aid which their special studies would so well enable them to do. I do not yet despair of enlisting some of the Strasburgers, de Barys, Goebels, and Van Tieghems in this honourable service. W. C. WILLIAMSON

Owens College

A Sparrow chasing Two Pigeons

ON Sunday, I asked three men what they were observing, when they pointed out a sparrow chasing two pigeons.

The pigeons were evidently greatly alarmed at their pugnacious attendant, who took occasional pecks at them when flying underneath, and whenever possible. The sparrow lost ground when the others made their more rapid doubling, but soon came up with them again, and renewed its attack.

What was the original quarrel of course we do not know, but the persistency of the sparrow's attack greatly amused us. Have any of your readers observed anything like this? or is there any record of the like? E. A. C.

Luton, Chatham, March 14

Top-shaped Hailstones

I DREW attention to hailstones possessing the above form in *Science Gossip* of December 1884. These pellets, which fell in my garden at Polmont, Stirlingshire, on the morning of May 6, 1884, were about one-fourth of an inch in length, and nearly three-sixteenths of an inch across. I did not see any horizontal stratification as observed by your correspondent Mr. Middlemiss, but found that each transverse section, when examined by a good lens, exhibited a fairly well-marked internal radiated fibrous structure, somewhat similar to that shown in sections of the mineral wavellite. Below are two (transverse and longitudinal) diagrammatic sections of the Polmont hailstones.

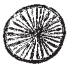

FIG. 1.—Transverse section (near base of cone) × 2.

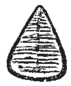

FIG. 2.—Longitudinal section × 1½.

Since then, however, I have found top-shaped hailstones composed of fibres radiating from the summit of the pyramid as shown in Fig. 3. ALEXANDER JOHNSTONE

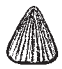

FIG. 3.—Longitudinal section.

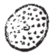

FIG. 4.—Transverse section of Fig. 3.

Edinburgh University

A Peculiar Radiation of Light

AT 10.30 p.m. this evening, my attention was called to a peculiar radiation of light in the eastern sky. The centre of radiation was due east, and the bars on the *right-hand side* were increased in brilliancy by light evidently arising from the moon, which was not visible, but concealed by cloud. The extent of these rays was from horizon to zenith; the rays being of unequal size, but of a pale gray colour, slightly iridescent.

The east wind was blowing smartly at the time, and I should like to be informed whether this strangely beautiful appearance in the sky was caused by the radiation of light from a rising moon on thin clouds, or was it the effect of a strong current of wind from a given point?

By 11 p.m. the moonlight was full; the moon still to the right of the axis of the rays, and the rays nearly dispersed.

Falmouth, March 12 ROBERT D. GIBNEY

THE CHEMICAL SOCIETY'S ANNIVERSARY MEETING

THE anniversary meeting of the Chemical Society was held on Wednesday, March 30. We give some extracts from the address of the President, Dr. Hugo Müller, on the recent progress of chemical science:—

As we contemplate this ceaseless activity in chemical research now manifested all over the world, and which from year to year is continually on the increase, we are nevertheless bound to recognise the fact that vast as the work thus accumulated may appear, there remains still much to be accomplished. The more the field is worked the richer will be the harvest.

Overwhelmed by the quantity of material, especially in the direction of the production of new compounds, hasty critics were wont to denounce such work as superfluous, but it is now generally recognised that we must still continue with the patient and careful elaboration of the substructure of facts before we can with advantage proceed with the longed-for rearing of the edifice of a comprehensive scientific generalisation, that is to say, of ideal chemistry.

The infinite complexity which inquiry reveals in every

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